

**REMARKS**

Claim 16 has been added. Support for new claim 16 can be found at page 6, paragraph 15. No new matter has been introduced.

Applicants have demonstrated the utility and enablement of the invention to satisfy the scope of the pending claims. In one aspect, Applicants have demonstrated the applicability of the claimed invention to 5 general classes of analytes: alcohols (see Examples) and to halogenated hydrocarbons, aromatics, unsubstituted hydrocarbons, and esters (see, e.g., Sisk and Lewis, Appendix A of response filed August 27, 2004). Accordingly, Applicants have demonstrated the applicability of the invention to analytes (thus satisfying claim 1 and 16) and chemicals (thus satisfying claim 2). The allegation in the Office Action appears to question the scope of biochemicals and the like. Each of the foregoing tested analytes is characteristic of most if not all side groups present in organic molecules including amino acids (building blocks of proteins and enzymes), nucleic acids (building blocks of DNA/RNA), lipids (e.g., hormones) and the like. Biochemicals and/or organic molecules are defined as containing at least one or more of the functional groups or chemical entities tested (e.g., the 5 classes mentioned above). Thus, the tested group of molecules can be associated with the genus "biochemicals" or "organic molecules," thus satisfying claim 3.

Furthermore, the number of species demonstrated to work in the methods and systems of the invention has been oversimplified in the present Office Action as merely 5 *classes* of analytes: alcohols, halogenated hydrocarbons, aromatics, unsubstituted hydrocarbons, and esters. It is submitted that at least *SEVENTY-FIVE* species have been tested and demonstrated to work in the system and methods of

the invention. The species are set forth in Table 1 (see also Sisk and Lewis reference of record).

**Table 1**

Alcohols	Halides	Aromatics	Hydrocarbons	Esters
Methanol	1-chlorobenzene	Benzene	Cyclooctane	Isopropyl acetate
Cyclopentanol	1-bromobutane	Propyl benzene	n-Hexane	Butyl acetate
2-butanol	Cyclohexyl chloride	m-xylene	n-octane	Pentyl acetate
1-pentanol	1,1,2-trichloroethane	o-xylene	n-decane	Methyl acetate
2-pentanol	1-bromopentane	p-xylene	3,3-dimethyl 1-butene	Isobutyl acetate
3 pentanol	3-chloro 2-methyl propene	Isopropyl benzene	n-heptane	Trans-2-hexenyl acetate
Isopropanol	1-chloropropane	Ethyl benzene	n-nonane	Hexyl acetate
Ethanol	2-chlorobutane	Toluene	Cyclopentane	Isopentyl acetate
1-butanol	1-fluorobenzene	1,2,4-trimethyl benzene	2,2,4-trimethyl pentane	Ethyl propionate
2-methyl 1-propanol	1-iodopropane	2,6-lutidine	Cyclohexane	Propyl acetate
3-methyl 1-butanol	2-bromo 2-methylpropane	2-picoline	n-pentane	Sec-butyl acetate
2-methyl 2-butanol	1-iodobutane	Pyridine	2,5-dimethyl 2,4-hexadiene	Isopentyl propionate
2-propen-1-ol	Chloroform	Anisole	2-methyl 2-butene	Pentyl butyrate
1-hexanol	Methylene chloride		7-methyl 1,6 octadiene	Isopentyl benzoate
2-methyl 3-buten-2-ol	1-chlorobutane		1,7-octadiene	Ethyl butyrate
			Cyclopentene	
			cyclooctene	

Amino acids, carbohydrates, nucleic acids, lipids are all chemical entities.

These 5 *classes* of compounds represent a genus of analytes that include basically all types of functional groups encountered in chemistry and biochemistry, including those in hormones, amino acids, enzymes, and the like. For example, hydrocarbons are compounds with only C and H and include 4 classes: alkanes, alkenes, alkynes, and aromatics. One or more of these 4 classes are present in amino acids and other biomolecules. Alcohol side groups are also present in these various biomolecules.

The Office Action states, for example, that lipids and fatty acids have some similarities to alcohols but allegedly would not be expected to have the same chemical properties because of different functionalities. Lipids and fatty acids (e.g., hormones) not only have some resemblance to alcohols, but they are also long chain *hydrocarbons*. Applicants have shown that hydrocarbons and alcohols work in the

methods and systems of the invention. Analytes comprising alcohols and/or hydrocarbons are detected and produce a signal profile using the sensor systems of the invention. Accordingly, the same alcohols and/or hydrocarbons on a lipid (e.g., a hormone) would also generate a signal profile.

The Office Action also states that Sisk and Lewis show that chemical functionalities can be discerned, however, the Office Action then alleges that this has little kinship to enzymatic activity, binding activity, or modulating activity. Applicants submit that the signal profile obtained from an unknown analyte (e.g., a chemical, a polypeptide, enzyme, antibody, lipid, etc.) is compared to profiles of other chemicals, polypeptides, enzyme, antibody, lipid etc. that have been associated with known enzymatic activity, binding activity and the like. A closest match between the signal profile of the unknown analyte and the profile of the known analytes is then made and the system indicates that the nearest match has, for example, a particular enzymatic activity, binding activity, structural characteristic (which are often indicative of enzyme activity and binding activity).

Applicants have shown that (a) the methods and systems of the invention can predict interaction of an analyte with an enzyme (e.g., P-450 enzyme system), by using a series of alcohols as a test example; (b) that the methods and systems of the invention can predict chemical classes, by using a collection of 75 species in 4 chemically different functional group genres as a test set; and (c) that the methods and systems of the invention can predict a set of other chemical and physical properties using a collection of 75 species that span basically the entire functionality of organic chemistry and biochemistry in their genus.

The Examiner appears to recognize that Applicants have demonstrated the applicability of the methods and systems of the invention to a genus of analytes comprising alcohols, halogenated hydrocarbons, unsubstituted hydrocarbons, aromatics and esters. These analytes represent organic molecules and as such this genus can also be stated to be organic molecules. Organic molecules include amino acids, nucleic acid, lipids, and the like.

In addition, the various 75 species shown to work in the methods and systems of the invention include building blocks and side chains of other chemical entities such as proteins, lipids, nucleic acids. Alcohols, hydrocarbons and the like are biochemicals and are subunits of larger biochemicals. Thus, Applicants submit that the species shown to work in the methods and systems of the invention are indicative of other biochemicals such as proteins (e.g., enzyme, antibodies, receptors), nucleic acids, lipids (e.g., hormones), and the like.


Applicants respectfully request allowance of the pending claims. Should the Examiner have any further questions or would like to discuss any remaining issue, the Examiner is invited to call the undersigned.

Please charge any required fee for consideration of this response or credit any overpayment to Deposit Account No. 02-4800, referencing the Attorney Docket No. above.

Respectfully submitted,

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